The Space Shuttle Discovery *is pictured here docked to the Destiny laboratory of the International Space Station.*

NASA S114E6459

Discovery *mission a success*

The Space Shuttle *Discovery* is home after a 14-day, 5.8-million-mile journey in space. The mission included breathtaking in-orbit maneuvers, tests of new equipment and procedures, a first-of-its-kind spacewalking repair and virtual visits with two heads of state.

Commander Eileen Collins and the crew of the STS-114 mission, Jim Kelly, Charlie Camarda, Wendy Lawrence, Steve Robinson, Andy Thomas and Soichi Noguchi of Japan, landed at Edwards Air Force Base, Calif., at 7:11 a.m. CDT on Aug. 9.

"We have had a fantastic mission," Collins said shortly after the crew disembarked from the Shuttle. "We brought *Discovery* back in great shape. This is a wonderful moment for us all to experience."

Discovery's mission, the first of two Return to Flight test missions following the 2003 *Columbia* accident, was one of the most complex spaceflights in NASA history. The crew flawlessly executed its to-do list.

After an on-time liftoff from Kennedy Space Center on July 26, the crew tested new capabilities and techniques developed over the past two-and-one-half years to inspect and possibly repair the Space Shuttle in orbit. Collins guided *Discovery* through an unprecedented backflip maneuver as it approached the International Space Station. The maneuver allowed the Station crew to snap high-resolution photos that added to the wealth of new data mission managers used to ensure *Discovery* was in good shape to come home.

"It's going to be hard to top this mission," NASA Administrator Michael Griffin said. "Everywhere you look, there's nothing but outstanding success."

Robinson and Noguchi, with the help of crewmates, completed three spacewalks. The astronauts repaired one Space Station Control Moment Gyroscope and replaced another. Their efforts put all four of the Station's gyros back into service. They also tested new repair techniques for the Space Shuttle's heat-shielding outer skin and installed equipment outside the Station.

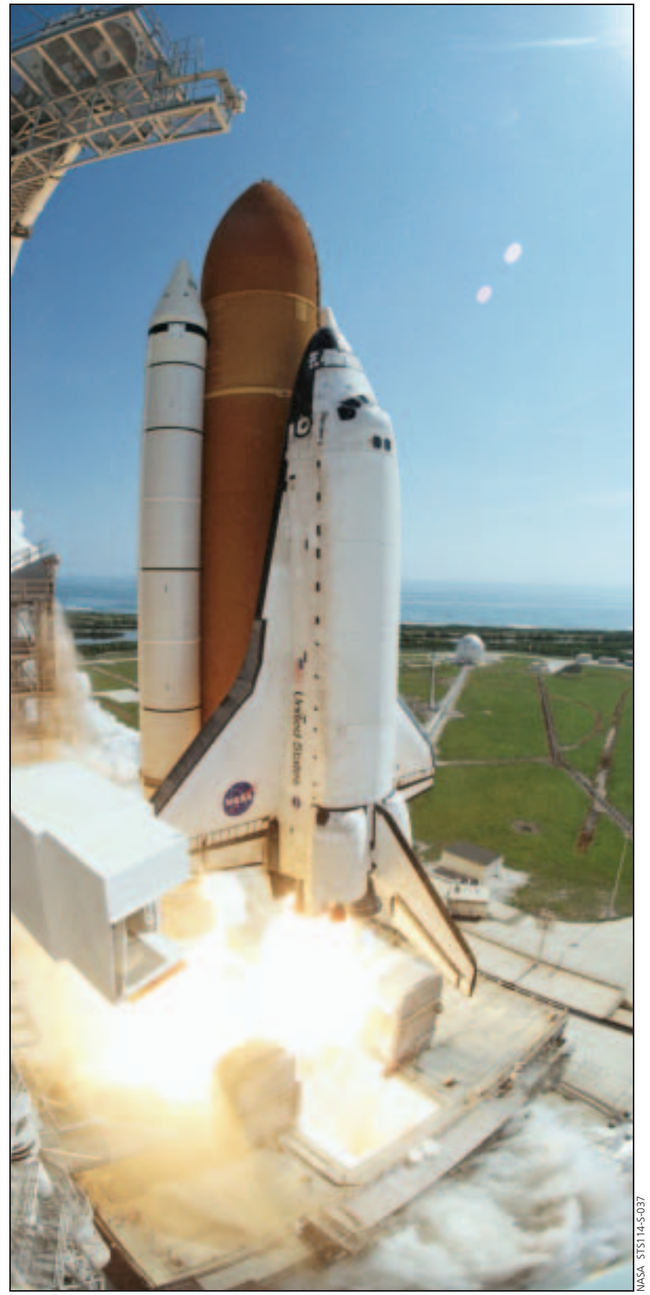
When two thermal protection tile gap fillers were spotted jutting out of *Discovery*'s underside, astronauts and other experts on the ground pulled together to devise a plan to prevent the protrusions from "tripping the boundary layer," causing higher temperatures on the Shuttle during atmospheric re-entry. Ground controllers sent up plans to the Shuttle-Station complex for Robinson to ride the Station robotic arm beneath the Shuttle and, with surgical precision, pluck out the gap fillers. Work on the Shuttle underbelly had never been tried before, but with Thomas coordinating, Lawrence and Kelly operating the robotic arms, and fellow spacewalker Noguchi keeping watch, Robinson delicately completed the extraction.

Discovery's astronauts and the Station crew, Russian Sergei Krikalev and American John Phillips, transferred more than 12,000 pounds of equipment and supplies to the Station. *Discovery* returned about 7,000 pounds of Station material to Earth.

The crew got phone calls from two world leaders. President George W. Bush and Japanese Prime Minister Junichiro Koizumi offered congratulations and appreciation for all the astronauts' hard work.

Commander Collins and the crew also paid tribute to the fallen astronauts of *Columbia*, as well as others who gave their lives for space exploration.

Over the next several weeks, engineers will process data from STS-114, the first of two test missions for the Space Shuttle. Teams are already at work looking into why a large piece of foam fell off the External Tank during ascent. NASA managers have committed to understanding why the foam came off the Tank and remedying it, if necessary, before clearing the next Space Shuttle Return to Flight test mission, STS-121, for flight.



NASA STS114-S-037

A tracking camera on Launch Pad 39B captures a close-up of Space Shuttle Discovery *moments after liftoff on the historic Return to Flight mission STS-114.*

STS-114 spacewalks

Astronaut Steve Robinson, STS-114 mission specialist, anchored to a foot restraint on the International Space Station's Canadarm2, participates in the mission's third session of extravehicular activity. The blackness of space and Earth's horizon form the backdrop for the image.

NASA S114E6642

The STS-114 crew performed three spacewalks while at the International Space Station. The crew tested techniques for repairing elements of the Space Shuttle's Thermal Protection System, replaced a Control Moment Gyroscope on the Station and installed an External Stowage Platform.

NASA S114E5979

Astronaut Soichi Noguchi, representing Japan Aerospace Exploration Agency (JAXA), waves at his spacewalking crewmate, Astronaut Steve Robinson, during EVA 2. Robinson can be seen in Noguchi's helmet visor using the new digital still camera outfitted for EVA exposure.

Extravehicular Activity 1

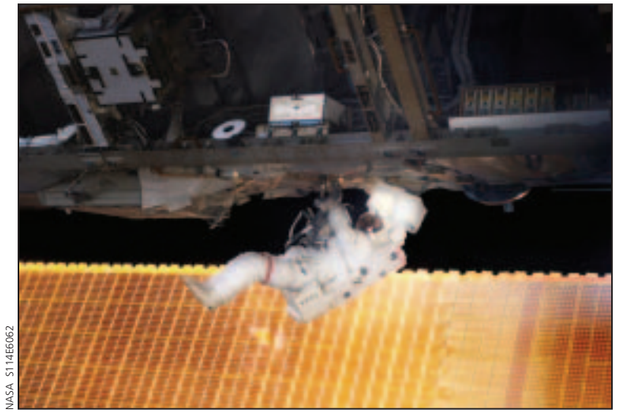
Soichi Noguchi, Steve Robinson
Flight Day 5
Start Time: 4:46 a.m. CDT, July 30
End Time: 11:36 a.m. CDT, July 30
Duration: six hours, 50 minutes

During the first extravehicular activity (EVA), the spacewalkers tested some new techniques for replacing or repairing damaged tiles on the Space Shuttle. For the repair demonstration, they worked with tiles and Reinforced Carbon-Carbon (RCC) intentionally damaged on the ground and brought into space in *Discovery*'s cargo bay. They tested an Emittance Wash Applicator for tile repair and Non-oxide Adhesive eXperimental (NOAX) for the RCC samples.

Extravehicular Activity 2

Soichi Noguchi, Steve Robinson
Flight Day 7
Start Time: 3:42 a.m. CDT, Aug. 1
End Time: 10:56 a.m. CDT, Aug. 1
Duration: seven hours, 14 minutes

The spacewalkers replaced a 600-pound gyroscope on the International Space Station, leaving the orbiting laboratory with a complete functional set of four. Called CMGs, the 600-pound devices maintain the Station's orientation in space, the way it is pointed and which part faces the Earth as it orbits the planet.



NASA S114E6062

Noguchi participates in the mission's first scheduled session of extravehicular activity. Noguchi and Robinson (out of frame) completed a demonstration of Shuttle thermal protection repair techniques and enhancements to the International Space Station's attitude control system during the successful six-hour, 50-minute spacewalk.

Extravehicular Activity 3

Soichi Noguchi, Steve Robinson
Flight Day 9
Start Time: 3:48 a.m. CDT, Aug. 3
End Time: 9:49 a.m. CDT, Aug. 3
Duration: six hours, one minute

During the third spacewalk, Noguchi and Robinson installed and activated an External Stowage Platform on the Station's Quest Airlock. The platform is designed to hold Orbital Replacement Units that will be delivered to the Station in the future. Noguchi also installed another Materials International Space Station Experiment. Finally, Robinson rode the end of the Station's Canadarm2 to the underside of *Discovery* to remove gap fillers from between the orbiter's heat-shielding tiles.